Übungen zur Modellierung, Wintersemester 2006/07
Andrea Ernst-Gerlach (LF 140), Ingo Frommholz (LF 138)
Sprechstunde abwechselnd Montag, 15-16 Uhr
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Übungsblatt 3 Abgabe bis 08.11.2006, 14:00 Uhr

Aufgabe 6: Missionaries and Cannibals Riddle

Three cannibals and three missionaries must cross a river. They have only one boot and their boat can only hold two people. All of the three missionaries can row the boot, but only one cannibal can row. The cannibals are friendly journeymen in general, but if in any situation - be it for a moment - more cannibals than missionaries are there, their desire for human flesh overwhelms them and the missionaries will be eaten in nothing flat.

Give a solution - similar to the example of missionaries-cannibals problem dealt in the lecture - for three missionaries and three cannibals:

(a) tabular
(b) as diagram

8 Punkte

Aufgabe 7: DNF and KCNF

The two following formulas are given:

\[ F_1 = ((A \rightarrow B) \rightarrow C) \]
\[ F_2 = (A \land (B \rightarrow (A \land C))). \]

(a) Write down the formula \( F_1 \) only using \( \land, \lor \) und \( \neg \). Determine for \( F_1 \) a semantically equivalent Formula in CNF by using equivalence conversions.
(b) Indicate the truthtable to \( F_2 \).
(c) Read a semantically equivalent formula in DNF for \( F_2 \) from the truthtable.
(d) Read a semantically equivalent formula in CNF for \( F_2 \) from the truthtable.

8 Punkte

Aufgabe 8: Tautology and Satisfiability

\( F \) and \( G \) are formulas in propositional logic. Indicate for both of the following statements, whether they are true or false and motivate your answer.

(a) Statement: \( F \lor G \) is exactly a tautology if \( F \) or \( G \) is a tautology.
(b) Statement: \( F \lor G \) is exactly then satisfiable if \( F \) or \( G \) is satisfiable.